

IN THE CLAIMS

Please amend the claims as follows:

Claim 1 (Currently Amended): A process for the preparation of an aqueous polymer dispersion by free radical aqueous emulsion polymerization comprising polymerizing at least one ethylenically unsaturated compound (monomer) in the presence of at least one dispersant, wherein

- a) into a reaction vessel at a temperature which is less than or equal to the starting reaction temperature T_S ,
- a₁) at least one portion of demineralized water,
- a₂) at least one portion of at least one oil-soluble free radical initiator,
- a₃) at least one portion of at least one dispersant,
- a₄) optionally, a portion of the at least one monomer and
- a₅) optionally, a portion of at least one water-soluble free radical initiator are initially added to form a reaction mixture in the reaction vessel, thereafter
- b) the reaction mixture obtained is, optionally, heated to the starting reaction temperature T_S , and thereafter
- c) the following are metered into the reaction mixture:
 - c₁) optionally, the remaining amount of demineralized water,
 - c₂) optionally, the remaining amount of the at least one oil-soluble free radical initiator,
 - c₃) optionally, the remaining amount of the at least one dispersant,
 - c₄) the total amount or, optionally, the remaining amount of the at least one monomer and
 - c₅) the main amount of the at least one water-soluble free radical initiator, and

d) the reaction mixture is heated to an end reaction temperature T_E during the metering of the at least one monomer, and wherein

the at least one water-soluble free radical initiator has a solubility of $\geq 1\%$ by weight at 20°C and atmospheric pressure in demineralized water, and the at least one oil-soluble free radical initiator has a solubility of $< 1\%$ by weight under the ~~above mentioned~~ process conditions and the total amount of water being such that the aqueous polymer dispersion obtained has a solids content of from 20 to 70% by weight,

the at least one water-soluble free radical initiator initiates a free radical polymerization reaction of the at least one monomer at the starting reaction temperature T_S , and

at least one oil-soluble free radical initiator has a half-life of ≥ 10 hours at the starting reaction temperature T_S and a half-life of ≤ 5 hours at the end reaction temperature T_E .

Claims 2-3 (Cancelled)

Claim 4 (Previously Presented): The process according to Claim 1, wherein $T_E \geq T_S + 10^\circ\text{C}$.

Claim 5 (Previously Presented): The process according to Claim 1, wherein T_S is from ≥ 30 to $\leq 120^\circ\text{C}$ and T_E is from ≥ 80 to $\leq 200^\circ\text{C}$.

Claim 6 (Previously Presented): The process according to Claim 1, wherein the amount of water-soluble and oil-soluble free radical initiator is in each case from 0.01 to 5% by weight, based on the total amount of monomer.

Claim 7 (Previously Presented): The process according to Claim 1, wherein the pressure during the polymerization is chosen so that the reaction mixture does not boil at any time.

Claim 8 (Previously Presented): The process according to Claim 1, wherein the at least one water-soluble free radical initiator used is a mono- or di-alkali metal or ammonium salt of peroxodisulfuric acid.

Claim 9 (Currently Amended): The process according to Claim 1, wherein the at least one oil-soluble free radical initiator used is at least one compound selected from the group consisting of tert-butyl peroxy-2-ethylhexanoate (~~Trigenox~~[®]-21), tert-amyl peroxy-2-ethylhexanoate, tert-butyl peroxybenzoate (~~Trigenox~~[®]-C), tert-amyl peroxybenzoate, tert-butyl peroxyacetate, tert-butyl peroxy-3,5,5-trimethylhexanoate (~~Trigenox~~[®]-42-S), tert-butyl peroxyisobutanoate, tert-butyl peroxydiethylacetate, tert-butyl peroxypropionate, tert-butyl peroxyisopropylcarbonate, (~~Trigenox~~[®]-BPIC) and tert-butyl peroxy-2-ethylhexylcarbonate (~~Trigenox~~[®]-117).

Claim 10 (Previously Presented): The process according to Claim 1, wherein the reaction mixture is kept at the end reaction temperature T_E for at least a further 30 minutes after the end of the monomer metering.

Claim 11 (Previously Presented): The process according to Claim 1, wherein the reaction mixture is stripped with inert gas and/or steam after the end of the monomer metering.

Claim 12 (New): The process according to Claim 1, wherein the ethylenically unsaturated monomer is a moderate to low solubility in water monomer under standard conditions and an amount of the monomer is at least 50 wt. % based on the total amount of monomers.

Claim 13 (New): The process according to Claim 1, wherein the ethylenically unsaturated monomer is a high solubility in water monomer under standard conditions and the amount of the monomer is equal or less than 10 wt. % based on the total amount of monomers.

Claim 14 (New): The process according to Claim 1, wherein the dispersant is a protective colloid or an emulsifier.

Claim 15 (New): The process according to Claim 1, wherein the total amount of the dispersant is from 0.1 to 5 wt.% based on the total amount of the monomer to be subjected to the free radical polymerization.

Claim 16 (New): The process according to Claim 1, wherein an amount of water in a₁) is equal or less than 50 wt.% based on the total amount of water.

Claim 17 (New): The process according to Claim 1, wherein an amount of the dispersant in a₃) is equal or less than 50 wt.% based on the total amount of the dispersant.

Claim 18 (New): The process according to Claim 1, wherein the monomer is added in a₄) and an amount of the monomer is equal or less than 50 wt.% based on the total amount of monomer.

Claim 19 (New): The process according to Claim 1, wherein the water-soluble free radical initiator is added in a₅) and an amount of the water-soluble initiator is equal or less than 30 wt.% based on the total amount of the water-soluble free radical initiator.

Claim 20 (New): The process according to Claim 1, wherein an amount of the oil-soluble free radical initiator in a₂) is at least 50 wt.% based on the total amount of the oil-soluble free radical initiator.

Claim 21 (New): The process according to Claim 1, wherein the metering of the at least one monomer is carried out from 10 minutes to 20 hours.

Claim 22 (New): The process according to Claim 1, wherein the metering of the at least one water-soluble free radical initiator is carried out in such a way that at least 50 wt.% of the water-soluble free radical initiator is added during the monomer metering.